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ABSTRACT

Basic considerations in the design of carrels and resource centers are covered in learner objectives, text, practice exercises, and answer sheets in this learning module. Topics addressed include factors influencing carrel design, workspace dimensions for writing carrels and electrically wired carrels, the proper distance from the chair seat to the work surface and the common height of carrel sides, where the projected image should appear in relation to the learner, why rear screen projection is popular in carrels, rear screen projection set-ups, the relationship of viewing angle to screen, handling image reversal, avoiding background noise, controlling image size and brightness, ways of providing acoustic isolation in carrels, and equipping a carrel for computer assisted instruction (CAI). Features required by multi-purpose resource centers are listed (such as furnishings, facilities, and functional areas), with special reference to the arrangement of carrels. Four references and a 13-item test are included. (Author/LMM)

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RESOURCE CENTERS AND CARREL DESIGN: An Instructional Module Prepared by Ann L. Wiley at the Rochester Institute of Technology for ICIT 745, Instructional Facilities Design and ICAV 560, Media Facilities Design.

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Objectives:

After reading the module, the learner will be able to:

1. Identify three factors which influence carrel design.

2. Give the dimensions for the workspace in a carrel which will be used for writing and in a wet carrel, the proper distance from the chair seat to the work surface, and the common height of the sides of carrels.

3. State where the projected image should appear in relation to the learner.

4. Explain why rear screen projection is popular in carrels.

5. Describe a rear screen projection set-up in a carrel with reference to screen size and type, relationship of viewing angle to screen, handling image reversal, avoiding keystoning, and controlling image size and brightness.

6. Identify two ways of providing acoustical isolation in carrels.

7. Describe a carrel equipped for CAI.

8. Name the items used to furnish a resource center.

9. Identify the areas which should be included in a resource center.

10. List considerations in arranging carrels in a resource center.

Abstract: The module presents basic considerations in designing carrels and resource centers.

Description of test: The test will consist of ten to fifteen short answer items corresponding to the objectives.

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Text and Practice Exercises:

CARREL DESIGN

The word carrel was first used to refer to the individual cubicles for study and reflection used in monasteries. Since 1965 we have seen the modern development of carrels as places for individual study in resource centers, libraries, classrooms, personnel departments, and industrial training sites.

The modern development of the carrel began as the work of B.F. Skinner in feedback and reinforcement began to influence education, resulting in the growth of self paced, individualized instruction. The carrel has been accepted as the best environment for individualized, self paced instruction, but there is less agreement on how best to design a carrel (Howe, 1976).

The design of a carrel and of the area in which it is used determine activities which can be performed in the carrel. One standard design does not fit all requirements for all learning activities which might be performed in a carrel.

There are three major factors to consider in designing a carrel:

- What the learner will do
- What the learner must see and hear
- How the carrel will be built (Spangenberg, 1975).

A couple of examples will illustrate carrel design for particular purposes more vividly than a simple discussion of abstract design considerations. Suppose you wanted to use a carrel for preemployment testing of office workers, who would be using a calculator and typewriter during the tests. You would use a "wet" - or electrically wired - carrel. The work space could be 24"x36"; that is adequate. The height would be important - it should be the same as a standard typewriter table.

If you were to use a carrel in industrial training, as a place where service representatives learned to repair office equipment, the carrel design would be very specific to the intended task. Sound deadening would be necessary. This can be achieved by having a leaded vinyl rear panel. A 30"x48" work space would be necessary. You could incorporate a projector for simultaneous viewing of projected images by including a projector shelf at eye level. Many more examples of how carrels could be designed for particular applications might be given (Howe, 1976).

Rather than examining any more examples of how carrels might be designed for particular applications, we will look at some general guidelines which can be applied to designing any carrel.

If the only activity is to be writing with paper and pencil, such as in a personnel office where applicants may sit at carrels to fill out the initial job application, the work surface can be 24"x16". It is important to have 11" from the chair seat to the work surface. If the work surface is the keyboard of a typewriter or computer terminal, there should be 11" from the chair seat to the keyboard (Spangenberg, 1975).

If the carrel must accomodate any other activity, or if it is to be wet and used for projecting audiovisual materials, it should have a work area at least 24"x36". This is a popular dimension.

The side extensions, or wings, of carrels are usually 18" - 24" high, and extend to the edge of the desk top or beyond.

Wiring a carrel is a challenge to the ingenuity of the designer. Only one aspect of wiring is certain. There must be enough power to operate the type of equipment which is to be used in the carrel. It is important to calculate the total watts to be drawn by the equipment and lights, and to make sure the circuit or circuits are adequate. Placement of wires and outlets is up to the designer. Clutter should be avoided to the greatest extent possible.

The projected image should be at eye level (Howe, 1976) or fifteen degrees below eye level. The image should be straight ahead of the viewer.

Rear screen projection is popular in carrels because it allows the learner light to engage in other activities while viewing the projected materials. The screen should be 10% brighter than the work area, but not as much as three times as bright.

Several variables control visual clarity and brightness. They are: screen size, screen material, other projection unit components and their design, and hardware, including projection lamps, lenses, and projection distance.

Screen size and type depend upon the material to be shown and the location of the learner. A one foot square screen in acceptable if the learner is to be between 2' and 10' away. A small screen works best in lighted rooms. In darkened rooms as much as half the visual acuity is lost when a small screen is used. Greater viewing distances are possible with small screens when the projected visual does not contain detailed material which is very small within the image.

The viewing angle depends on the type of material the screen is made of. Visual acuity is best in the area where brightness appears at 50-100% of full brightness. Visual acuity is acceptable where the image is 25-50% as bright as it appears when viewed at a 90 degree angle to the screen. When material is viewed on a rear screen at angles greater than 60 degrees by a learner in a carrel, distortion results.

A problem in designing carrels is the reversal of an image caused by using rear screen projection. This is corrected by installing an odd number of mirrors as part of the projection set-up. The projector must be kept perpindicular to the screen to avoid keystoning. The projection set-up has to serve all types of media equally well. The image should always fill the screen. Different sizes of lenses project different sized images at the same projection distance, and lens size should be relied upon to

Text, cont:

control the image size from a fixed projection distance. Popular projection distances in carrels are 16-22".

Lamp brightness will depend on the room lighting, the viewing area, and the content of the image. Image brightness can be increased by moving the projector closer to the screen. Reducing the projection distance by one-half can increase image brightness four times. Reducing image brightness may be necessary too. It is important that image brightness not exceed three times the brightness of the work area. A lower wattage projection lamp results in a less bright image. Image brightness can also be reduced by raising the level of light in the room, but this is costly and raises the room temperature too.

Audio service to carrels is usually provided by equipping each one with a headset. Headsets isolate the sound in one carrel from another. Providing acoustical isolation through carrel structure is difficult.

Headsets usually deliver sound in the 40-45dB range. Research has shown that listening errors do not occur when the male speaking voice is heard at a level at least 30dB over the background noise. Background noise and other noise not related to the learning activity is more distracting to the learner than unrelated visual phenomena (Spangenberg, 1975).

When carrels are equipped for computer assisted instruction, the most complicated consideration is the hook up to the computer. If there are cables to a computer in the facility itself, the cables restrict location of carrels. If the hook up is to a computer elsewhere, there must be telephone lines.

A carrel equipped for CAI must include a computer terminal and some or all of the following: a printer, television monitor, light pen, tape player, and earphones. There must be sufficient power to operate the terminal and the other lights and projection lamps in the carrel (McVey, 1977).

Practice Exercises:

1. Identify three factors which influence carrel design.

2. Give the dimensions for the workspace in a carrel in which the only activity will be writing with paper and pencil.

3. How many inches should the chair seat be from the work surface?

4. Identify a popular dimension for the workspace in a wet carrel.

5. Give the common height of sides of carrels.

6. In relation to the learner, where should the projected image appear?

7. Explain why rear screen projection is popular in carrels.

8. Describe a rear screen projection set-up in a carrel. Include in your

Practice Exercises, cont:

description: screen size and type, relationship of viewing angle to screen, handling image reversal, avoiding keystoning, controlling image size and brightness.

9. Identify two ways of providing acoustical isolation in carrels.

10. Describe a carrel equipped for CAI.

Answers:

1. Identify three factors which influence carrel design.

- what the learner will do
- what the learner must see and hear
- how the carrel will be built

2. Give the dimensions for the workspace in a carrel in which only writing with paper and pencil will take place.

16"x24"

3. How many inches should the chair seat be from the work surface?

11"

4. Identify a popular dimension for the workspace in a wet carrel.

24"x36"

5. Give the common height of the sides of carrels.

18-24"

6. In relation to the learner, where should the projected image appear?

at eye level or 15 degrees below, right in front of the learner

7. Explain why rear screen projection is popular in carrels.

allows learner light for other tasks

8. Describe a rear screen projection set-up in a carrel. Include in your description: selection of screen size and type, relationship of viewing angle to the screen, handling image reversal, avoiding keystoning, controlling image size and brightness.

screen size depends on material to be shown and location of learner; small screens are best in lighted rooms, with learner 2' to 10' away.

viewing angle depends on type of material screen is made of.

image reversal is corrected with an odd number of mirrors in the projection set-up. projector must be perpindicular to screen to avoid keystoning.

image size is controlled with projection lenses, brightness with projection lamps, by changing projection distance, or by changing room lighting.

projection distance is usually fixed at 16-22"

9. Identify two means of providing acoustical isolation in carrels.

headsets and structural barriers

10. Describe a carrel equipped for CAI.

will have terminal and some or all of the following: printer, monitor, light pen, tape player, earphones. will have cables or telephone lines for hook up to the computer.

Text, cont:

RESOURCE CENTERS

A resource center provides the services of a library for a range of media. Those services include: acquiring, cataloging, indexing, storing, retrieving, using, and restoring information resources. A resource center must handle the materials and keep them readily available for users in such a way as to support the educational objectives and philosophies of the institution as a whole. The resource center may be used as a repository for materials, or may be involved in the educational program to such an extent that it becomes the focus of the entire program (Educational Facilities, 1975).

The following areas must be included in the design of a learning resource center. While all the areas may not be within the resource center, all should be accessible to it, and all will be included in a full service resource center.

- Furnishings, as follows: carrels, tables with seats, tables with low dividers, writing cubicles, lounge chairs.
- At least some carpeted areas.
- Conference and listening rooms.
- A large group viewing room with front and rear screen projection.
- A medium group viewing room and a flexible medium-small group room, both with rear screen projection.
- Administrative and work areas.
- Media, book, and periodical storage.
- Leisure reading area.
- Independent study area.
- Simple production area and reproduction facilities.
- Computer terminal facilities.
- A television studio (Educational Facilities, 1975; McVey, 1977).

A design consideration specific to the resource center is the arrangement of carrels. Carrels should be grouped together to take best advantage of common services, including room lighting and electrical power, acoustical isolation and heating, ventilation, and air conditioning. When there are many carrels together it is important to break up the space visually and functionally. When carrels are lined up row upon row the effect is depressing and confining (Educational facilities, 1975).

There are many styles of carrel available. Some have straight legs; others have cantilevered legs or pedestal bases. Cantilevered

Text, cont:

legs are a bracket support. They are sturdy and result in an uncluttered appearance. Carrels may have post/panel or full panel bases. Full panel bases make it difficult to clean the room. Post/panels are about a foot off the floor.

The simplest way to create a carrel is to use an existing table and fit it with a portable divider.

There are a number of modular carrels which offer flexibility in room arrangement, and make it easy to add and subtract positions. Modular carrels share side walls. The most flexible have no right or left sides - only universal panels(Howe, 1976).

Practice exercises:

1. Name the items used to furnish a resource center.

2. Identify the areas which should be included in a resource center.

3. List considerations in arranging carrels in a resource center.

Answers:

1. Name the items used to furnish a resource center.

- carrels
- tables with seats
- tables with low dividers
- writing cubicles
- lounge chairs
- carpeting
- computer terminals

2. Identify the areas which should be included in resource center design.

- conference rooms
- listening rooms
- large, medium, and flexible group spaces
- administrative and work areas
- media, book, periodical storage
- leisure reading
- simple production
- reproduction or copying
- television studio
- computer terminal facilities

3. List considerations in arranging carrels in a resource center.

- group carrels to take advantage of room lights, power, acoustics, HVAC
- break up the space to avoid clutter, confining effect
- type of leg - cantilevered reduces clutter
- type of panel
- modularity

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ICIT 745 ICAV 560 Facilities Design

RESOURCE CENTERS AND CARREL DESIGN - TEST

3 1. Identify three factors which influence carrel design.

2 2. Give the dimensions for the work surface in a carrel which will be used only for writing with paper and pencil and in a wet carrel.

1 3. How many inches should the chair seat be from the work surface?

1 4. Give the common height of the sides of carrels.

2 5. In relation to the learner, where should the projected image appear?

2 6. Explain why rear screen projection is popular in carrels.

5 8. Describe a rear screen projection set-up in a carrel. Include reference to: screen size and type, relationship of viewing angle to screen, image reversal, keystoning, controlling image size and brightness.

2 9. Identify two ways of providing acoustical isolation in carrels.

3 10. Describe a carrel equipped for CAI.

5 11. Name the items used to furnish a resource center.

7 12. Identify areas which should be included in a resource center.

3 13. List considerations in arranging carrels in a resource center.

N.B. Each point corresponds to a required response.
E.g. list at least 5 items for question 11, at least 7 for question 12.

36 - 32 A

33 - 31 B

Below 31 study and retake test.

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